

METTLER TOLEDO APPLICATION NOTE

pH Measurement In Sodium Hydroxide

BACKGROUND

In the manufacturing of sodium hydroxide by a membrane process, pH measurement is very important, especially before desalinating the brine.

THE PROCESS

Na₂SO₃ is added to the weak salt water according to the pH value, which is returned to the chemical salt process after antichloration. Two measuring points are required: before antichloration and after antichloration.

In order to provide an accurate pH measurement, certain concerns must be reviewed and taken into consideration:

1. The large amount of free chlorine in the medium may influence the electrode potential (i.e., change in electrode potential is not linear to changes in H⁺ ions.)
2. The low pH value of the sample solution (about pH 1.9) may cause difficulty in measurement. There is an inherent error when the pH value is below 2 or greater than 12.
3. Because of the elevated temperature of the process, temperature compensation is required for accurate measurements.

INSTRUMENTATION

The liquid-filled InPro[®] 2000 pH electrode with Viscolyt reference electrolyte, three ceramic diaphragms, and a high-alkalinity (HA) membrane is recommended for this application. This electrode will easily withstand the harsh process due to its inherent resistance to conditions such as high temperature and pressure. The InPro 2000 electrode is recommended for process installation through a PFA coated InFlow[®] 764-22/56 flow-through housing with an overpressure of 29 psi. This system prohibits free chlorine from influencing the electrode potential and also limits back permeation. The InPro 2000 will ensure the accuracy of the measurement and prolong the lifetime of the electrode. The transmitter for this application is the Model 2100/X two-wire transmitter.

PRODUCTS

2100 pH Analyzer

- Detachable front panel and plug-in terminals for ease of installation
- All functions accessible through the keypad for increased ease of use
- Continuous sensor and transmitter diagnostics to monitor performance
- FM certification for Class I, Div 1 & 2 Environments and CSA General Purpose Approval
- 3 year warranty

InPro[®] 2000 Combination pH Electrode

- Refillable for increased electrode lifetime and reduced maintenance
- Liquid-fill design ensures fast response, highest accuracy and reliability
- Silver ion trap to minimize electrode contamination
- Integral RTD for higher measurement accuracy
- Rugged IP67 rated quick connect VarioPin connector

InFlow[®] 764-22/56 Flow Through Housing

- For in-line mounting in small pipes
- Choice of materials of construction for chemical compatibility